



# VEGETATION APPENDIX

## Habitat Types and Biological Diversity

The land classification system developed by the University of Montana, Montana Gap Analysis Project (MT-GAP), was used to estimate acreages listed for this Appendix (Fisher et al. 1998).

### Grasslands

Grasslands cover approximately 10.4 million acres of the 16-county planning area. Of this acreage, 3.5 million acres are underlain by subbituminous or bituminous coal deposits. Grasslands are divided into five types (see Table VEG-1). Species richness data for these types are provided.

**Altered herbaceous habitats** include grasslands with 30 percent or more cover from introduced species and/or noxious weed species such as thistle (*Cirsium* spp.), cheat grass (*Bromus tectorum*), Japanese brome (*B. japonicus*), spotted knapweed (*Centaurea maculosa*), crested wheatgrass (*Agropyron cristatum*) or yellow sweetclover (*Melilotus officinalis*). Total herbaceous cover ranges from 20 to 80 percent on these sites, which are usually associated with disturbance and can have bare ground coverages in the 10 to 50 percent range (Fisher et al. 1998).

**Very Low Cover Grasslands** are semi-desert grasslands with total grass cover of 10 to 30 percent. They are dominated by short grasses and forbs such as blue grama (*Bouteloua gracilis*). These grasslands typically have a high amount of bare soil (20 to 60 percent) (Fisher et al. 1998).

**Low to Moderate Cover Grasslands** are the most abundant grassland type in Montana. They are the category that has the greatest potential for impact from CBM extraction (see Table VEG-1). Total grass coverages on these sites range from 20 to 70 percent and are dominated by short- to medium-height grasses and forbs, such as blue grama, green needlegrass (*Stipa viridula*), Idaho fescue (*Festuca idahoensis*), lupine (*Lupinus* spp.), arrowleaf balsamroot (*Balsamorhiza sagittata*), and bluebunch wheatgrass (*Agropyron spicatum*) (Fisher et al. 1998).

**Moderate to High Cover Grasslands** are dominated by medium to tall grass species, such as bluebunch wheatgrass, green needlegrass, big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), little bluestem (*Andropogon scoparium*),

and needle and thread (*Stipa comata*). Grass coverage on these grasslands ranges from 50 to 100 percent (Fisher et al. 1998).

**Montane Parklands and Subalpine Meadows** are the final type of grasslands classification for Montana lands. Total herbaceous cover in these moist locations can range from 30 to 100 percent and are dominated by species such as beargrass (*Xerophyllum tenax*), several species of sedge (*Carex* spp.), pinegrass (*Calamagrostis rubescens*), arnica (*Arnica* spp.), and subalpine daisy (*Erigeron peregrinus*) (Fisher et al. 1998).

### Shrublands

Of the 5 million acres designated as shrubland in the planning area, approximately 1.8 million acres are underlain by bituminous coal deposits. Shrublands in Montana are divided into seven categories: Mixed Mesic Shrubs, Mixed Xeric Shrubs, Silver Sage, Salt-Desert Shrubs, Mesic-Grassland Shrubs, Xeric-Grassland Shrubs, and Sagebrush (see Table VEG-2).

**Mixed Mesic Shrub** sites are characterized by 20 to 100 percent shrub cover. Dominant shrubs on these sites are alder (*Alnus* spp.), ceanothus (*Ceanothus* spp.), huckleberry (*Vaccinium* spp.), ninebark (*Physocarpus malvaceus*), snowberry (*Symphoricarpos* spp.), and western serviceberry (*Amelanchier alnifolia*).

**Mixed Xeric Shrub** sites are characterized by shrub cover ranging from 20 to 50 percent. Dominant shrubs for this type are bitterbrush (*Purshia tridentata*), creeping juniper (*Juniperus horizontalis*), greasewood (*Sarcobatus* spp.), mountain mahogany (*Cercocarpus* spp.), and rabbitbrush (*Chrysothamnus* spp.). Associated grass species cover from 5 to 40 percent of these sites and are predominantly bluebunch wheatgrass, blue grama, Idaho fescue, and western wheatgrass (*Agropyron smithii*).

**Silver Sage** sites are dominated by silver sage (*Artemisia cana*). This alkali-tolerant species is most abundant in the northeastern part of Montana on moist sites near riparian areas.

**Salt-Desert Shrub and Dry Salt Flat** sites are dominated by Saltsage (*Atriplex nuttallii*) at 10 to 40 percent cover. These sites are usually underlain by alkali-affected soils in dry, sandy, or saline-seep areas. Species associated with these sites are blue grama, Sandberg's bluegrass (*Poa secunda*), and threadleaf sedge (*Carex filifolia*). It occurs mainly in eastern and southeastern Montana.

**Mesic Shrub-Grassland Associations** are shrublands with co-dominance between shrubs and grasses that together cover 10 to 50 percent of the site. These are moist, ecotonal areas between shrub-dominated and grass-dominated sites. The grass and shrub species are those found in the respective classes that make up the association.

**Xeric Shrub-Grassland Associations** are shrublands with a co-dominance of xeric shrubs and grass species in the ecotone between grass- and xeric shrub-dominated sites with the same dominant species as those types. Cover of both shrubs and grasses on these sites range from 10 to 50 percent.

**Sagebrush** shrubland sites are dominated by big sagebrush (*Artemisia tridentata* spp. *tridentata*, *vaseyana*, and *wyomingensis*) and black sagebrush (*Artemisia nova*) at 20 to 80 percent cover. These are associated with the same grass species listed under the Mixed Xeric Shrub habitat type. Sagebrush shrublands are particularly characteristic of the counties that make up the Billings RMP area where more than 40 percent (910,000 acres) of shrublands fall within this category (Fisher et al. 1998).

## Forests

Of the 4.5 million acres classified as forest in the planning area, almost 1.4 million acres are underlain by bituminous coal deposits. The acreages underlain with subbituminous or bituminous coal within each forest type in the 16 counties affected by this project are given in Table VEG-3.

## Riparian Areas

Table VEG-4 gives the breakdown by type for riparian areas in the project area that are underlain by coal beds. The types with the most acreage are in the Graminoid and Forb and the Shrub categories.

**Graminoid and Forb Riparian** areas are characterized by herbaceous species at 30 to 100 percent cover and less than 15 percent cover of shrubs and trees. Standing water may be present in areas with cattail marshes. Plant species associated with this type are sedges (*Carex* spp.), cattails (*Typha* spp.), reedgrass (*Calamagrostis* spp.), rushes (*Juncus* spp.), saxifrage (*Saxifraga* spp.), and tufted hairgrass (*Deschampsia caespitosa*).

**Shrub Riparian** sites are dominated by shrub cover at 20 to 100 percent and tree cover at less than 15 percent. Standing water may be present in willow marshes in this category. Shrub species potentially present on shrub-dominated sites include alder (*Alnus* spp.), black hawthorn (*Crataegus douglasii*), birch (*Betula* spp.), currant (*Ribes* spp.), red-osier dogwood (*Cornus stolonifera*), rose (*Rosa* spp.), shrubby cinquefoil (*Potentilla fruticosa*), snowberry (*Symphoricarpos* spp.), thimbleberry (*Rubus parviflorum*), twinberry (*Lonicera involucrata*), Utah honeysuckle (*Lonicera utahensis*), and willows (*Salix* spp.) (Fisher et al. 1998).

## Barren Lands

Table VEG-5 shows that some of the classifications, such as Badlands and Missouri Breaks, have a significant number of species associated with them.

## Additional Tables

Additional Tables within this appendix include Tables VEG-6, VEG-7 and VEG-8; Table VEG-6 shows critically imperiled plant species in the state with potential habitat in the emphasis area, Table VEG-7 shows noxious weeds found in the state, and Table VEG-8 indicates critically imperiled plant species by project area.

**TABLE VEG-1**  
**GRASSLAND TYPES AND ASSOCIATED WILDLIFE DIVERSITY**

<b>Grassland Types</b>	<b>Total Acres In Project Area With Underlying Bituminous Coal Beds</b>	<b>Distribution</b>	<b>Species Richness*</b>
Altered Herbaceous Habitats	87,365	Found throughout Montana, but most concentrated in the northeastern part of the state.	66
Very Low Cover Grasslands	35,4315	Associated with alkaline soils or with disturbance.	68
Low to Moderate Cover Grasslands	2,864,901	Occurs across the state in valleys and foothills and on south aspects in the mountains.	78
Moderate to High Cover Grasslands	228,341	Associated with wet sites primarily in the valleys of central and eastern Montana.	72
Montane Parklands and Subalpine Meadows	13,563	Found at mid- to upper elevations either within forests or above timberline.	62

\*Mean number of native terrestrial vertebrates species predicted by habitat type (Fisher et al. 1998). Species richness estimates are simple species counts and not intended to imply that areas with fewer species are not as important as areas with larger numbers of species.

**TABLE VEG-2**  
**SHRUBLAND TYPES AND ASSOCIATED DISTRIBUTION AND SPECIES RICHNESS**

<b>Shrubland Types</b>	<b>Total Acres in Project Area Underlain by Bituminous Coal Beds</b>	<b>Distribution</b>	<b>Species Richness*</b>
Mixed Mesic Shrub	186,229	Found in western Montana and in draws or north slopes in eastern Montana	63
Mixed Xeric Shrub	733,617	Occur on dry rocky sites in valleys and low elevation mountain slopes.	75
Silver Sage	7,900	Primarily found in northeastern Montana on moist sites near riparian areas.	61
Salt-Desert Shrub and Dry Salt Flat	22,226	Usually associated with alkaline sites or blowouts in dry, sandy, or saline-seep areas in eastern Montana.	29
Sagebrush	581,160	Occur across the state in valleys and low- to mid-elevational mountain slopes.	74
Mesic Shrub-Grassland Associations	120,950	Found in central and eastern Montana valleys and some low mountain slope areas in moist ecotonal areas between shrub-dominated and grass-dominated sites.	75
Xeric Shrub-Grassland Associations	155,091	Occur primarily in eastern and central Montana valleys and some low mountain slopes on dry sites in valleys, in the ecotone between grass and xeric shrub dominated sites.	85

\*Mean number of native terrestrial vertebrates species predicted by habitat type for Montana (Fisher et al. 1998).

**TABLE VEG-3**  
**FOREST TYPES IN THE PROJECT AREA UNDERLAIN BY COAL BEDS**

<b>Forest Type</b>	<b>Total Acres in Project Area Underlain by Bituminous Coal Deposits</b>	<b>Distribution</b>	<b>Species Richness*</b>
Douglas-fir ( <i>Pseudotsuga menziesii</i> )	23,985	Occurs across the state, except for the northeastern corner, but primarily found in western and south-central Montana.	77
Douglas-fir with Lodgepole Pine	2,446	Occurs in western and south-central Montana on mid-upper elevational slopes.	72
Limber Pine ( <i>Pinus flexilis</i> )	5,170	Dry forest sites at lower elevations in central Montana and at higher elevations on limestone soils in central and eastern Montana.	53
Lodgepole Pine ( <i>Pinus contorta</i> )	3,791	Occurs primarily in western and south-central Montana in mountainous regions at cooler, mid-high elevations.	65
Low Density Xeric Forest	304,760	Occurs primarily in eastern Montana on low hills on the edge of grasslands.	83
Mixed Broadleaf & Conifer Forest	28,179	Occurs across the state, primarily in moist forest areas, near riparian areas or in woody draws.	82
Mixed Subalpine Forest	71,368	Occurs at mid-high elevations in western and south-central Montana, usually on north, east, and northwest aspects.	67
Mixed Whitebark Pine Forest	218	Occurs in high elevation forest stands at or near tree line in western and south-central Montana.	39
Mixed Xeric Forest	34,382	Occurs at low-mid elevations on dry forest sites in western Montana.	76
Ponderosa Pine	857,864	Occurs across the state, except in northeastern Montana at lower elevations on dry forest sites.	79
Rocky Mountain Juniper ( <i>Juniperus scopulorum</i> )	18,547	Occurs primarily in central and eastern Montana on dry forest sites.	58
Standing Burnt Forest	2,008	Occurs across the state in forested areas and includes only stands that have burned in the 5 years prior to 1998.	63
Utah Juniper ( <i>Juniperus osteosperma</i> )	4,990	Occurs primarily in central and eastern Montana on dry forest sites, particularly in Carbon County.	70

\*Mean number of native terrestrial vertebrate species predicted by habitat type (Fisher et al. 1998).

**TABLE VEG-4**  
**RIPARIAN AREAS IN THE PROJECT AREA UNDERLAIN BY COAL BEDS**

<b>Riparian Types</b>	<b>Total Acres in Project Area Underlain by Bituminous Coal Deposits</b>	<b>Distribution</b>	<b>Species Richness*</b>
Conifer	1,205	Occurs in riparian areas in western and south-central Montana.	114
Broadleaf	44,324	Occurs in riparian areas across Montana.	123
Mixed Broadleaf & Conifer	6,789	Occurs in riparian areas of western and south-central Montana.	134
Graminoid & Forb	191,165	Occurs across the state.	72
Mixed Riparian	35,204	Occurs across the state	104
Shrub	99,671	Occurs across the state.	110

\*Mean number of native terrestrial vertebrate species predicted by habitat type (Fisher et al. 1998).

**TABLE VEG-5**  
**BARREN LANDS**

<b>Barren Lands</b>	<b>Total Acres in Project Area Underlain by Bituminous Coal Deposits</b>	<b>Distribution</b>	<b>Species Richness*</b>
Badlands	244,658	Occurs primarily in central and eastern Montana on sites where bare soil or rock is the dominant cover. Patches of grass or shrubs total less than 10 percent cover. Tree canopy is less than 10 percent on treed sites.	48
Mines, Quarries, Gravel Pits	15,248	Occurs across Montana and are as named.	13
Missouri Breaks	15,272	Occurs between Fort Benton in the west and Fort Peck in the east and parallels the Missouri River.	54
Mixed Barren Sites	50,489	Occurs across the state where live vegetation provides less than 10 percent cover.	17
Rock	26,982	Exposed rock, cliffs, talus slopes, or scree fields across the state.	14

\*Mean number of native terrestrial vertebrate species predicted by habitat type (Fisher et al. 1998).

**TABLE VEG-6**  
**STATE OF MONTANA CRITICALLY IMPERILED PLANT SPECIES WITH POTENTIAL HABITAT IN THE 16-COUNTY AREA**

<b>Common Name (Scientific Name)</b>	<b>Habitat</b>
Dwarf onion ( <i>Allium simillimum</i> )	Moist, often gravelly soil of meadows and grasslands in the montane or lower subalpine zone.
Daggett rock cress ( <i>Arabis demissa</i> var. <i>languida</i> )	Canyon bottoms and outwash plains with dry, stony soils derived from limestone in juniper woodland.
Swamp milkweed ( <i>Asclepias incarnata</i> )	Wet meadows and thickets.
Ovalleaf milkweed ( <i>Asclepias ovalifolia</i> )	Open pine woodland in seasonally moist meadow in southeastern Montana.
Narrowleaf milkweed ( <i>Asclepias stenophylla</i> )	Sandy soils of prairies and open pine woodland in southeastern Montana.
Sweetwater milkvetch ( <i>Astragalus aretioides</i> )	Thin soils of exposed ridges and slopes in the valleys and montane zone.
Barr's milkvetch ( <i>Astragalus barrii</i> )	Gullied knolls, buttes, and barren hilltops, usually on calcareous soft shale or siltstone.
Wind River vetch ( <i>Astragalus oreganus</i> )	Sandy or clayey soil in desert shrublands and sagebrush grassland in the valley zone in south-central Montana.
Wedge-leaved saltbush ( <i>Atriplex truncata</i> )	Vernally moist, alkaline soil around ponds and along streams in the valleys.
Large-leafed balsamroot ( <i>Balsamorhiza macrophylla</i> )	Sagebrush and grasslands in the montane zone.
Small camissonia ( <i>Camissonia parvula</i> )	Sandy calcareous soils of sagebrush steppe and juniper woodlands in the valleys.
Pregnant sedge ( <i>Carex gravida</i> var. <i>gravida</i> )	Open woods, often in ravines with deciduous trees, on the plains of southeastern Montana.
Many-ribbed sedge ( <i>Carex multcostata</i> )	Grasslands and meadows in the montane and subalpine zones.
Toothed Scandinavian sedge ( <i>Carex norvegica</i> ssp. <i>inserrulata</i> )	Moist alpine turf.
Tall centaury ( <i>Centaureum exaltatum</i> )	Moist, alkaline soil around ponds and streams on the plains.
Birchleaf mountain-mahogany ( <i>Cercocarpus montanus</i> var. <i>glaber</i> )	Open slopes and breaks on the plains of eastern Montana.
Smooth goosefoot ( <i>Chenopodium subglabrum</i> )	Sparsely vegetated sand dunes and sandy terraces of major rivers on the plains of eastern Montana.



**TABLE VEG-6**  
**STATE OF MONTANA CRITICALLY IMPERILED PLANT SPECIES WITH POTENTIAL HABITAT IN THE 16-COUNTY AREA**

<b>Common Name (Scientific Name)</b>	<b>Habitat</b>
Yellow bee plant ( <i>Cleome lutea</i> )	Open, often-sandy soil of sagebrush steppe in the valleys.
Miner's Candle ( <i>Cryptantha scoparia</i> )	Sandy soil of sagebrush steppe in the valleys.
Nine-anther dalea ( <i>Dalea enneandra</i> )	Gravelly grasslands slopes on the plains of eastern Montana.
Silky prairie clover ( <i>Dalea villosa</i> var. <i>villosa</i> )	Loose sand of sand dunes or eroded from sandstone outcrops in eastern Montana.
Scribner's panic grass ( <i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i> )	Open ponderosa pine woodlands of valleys and plains.
White Arctic draba ( <i>Draba fladnizensis</i> )	Rocky, open soil in the alpine zone.
Porsild's draba ( <i>Draba porsildii</i> )	Moist, gravelly open soils in the alpine zone.
Entire-leaved avens ( <i>Dryas integrifolia</i> )	Stony, limestone-derived soil of exposed ridges and plateaus in the alpine zone.
Eaton's daisy ( <i>Erigeron eatonii</i> ssp. <i>eatonii</i> )	Open areas in mountains and foothills.
Beautiful fleabane ( <i>Erigeron formosissimus</i> var. <i>viscidus</i> )	Meadows and forest openings in the montane and subalpine zones.
Smooth buckwheat ( <i>Eriogonum salsuginosum</i> )	Barren, often bentonitic soil of badlands in the valleys.
Visher's buckwheat ( <i>Eriogonum visheri</i> )	Barren, often bentonitic badlands slopes and outwashes in the plains.
Sheared cotton-grass ( <i>Eriophorum callitrix</i> )	Wet, organic soil of fens and seep areas in alpine tundra.
Joe Pye weed ( <i>Eupatorium maculatum</i> var. <i>bruneri</i> )	Mesic meadows, springs, margins of streams, and swamp thickets in valleys and on the plains.
Hiker's gentian ( <i>Gentianopsis simplex</i> )	Fens, meadows, and seeps, usually in areas of crystalline parent material, in the montane and subalpine zones.
Discoid goldenweed ( <i>Haplopappus macronema</i> var. <i>macronema</i> )	Rocky, open or sparsely wooded slopes, often in coarse talus, in or near the alpine zone.
Hutchinsia ( <i>Hutchinsia procumbens</i> )	Vernally moist, alkaline soil of sagebrush steppe in the valley to lower montane zones.
Large-fruited kobresia ( <i>Kobresia macrocarpa</i> )	Moist tundra, solifluction* slopes, and gravelly lake shores in the alpine zone.
Island koenigia ( <i>Koenigia islandica</i> )	Wet, open, gravelly soil in seepage areas in the alpine zone.

**TABLE VEG-6**  
**STATE OF MONTANA CRITICALLY IMPERILED PLANT SPECIES WITH POTENTIAL HABITAT IN THE 16-COUNTY AREA**

<b>Common Name (Scientific Name)</b>	<b>Habitat</b>
Lesica's bladderpod ( <i>Lesquerella lesicii</i> )	Gravelly, limestone-derived soil of open ridges and slopes among Douglas-fir and mountain mahogany woodlands in the montane zone.
Nuttall's desert parsley ( <i>Lomatium nuttallii</i> )	Dry, rocky slopes of open pine woodland in the plains.
Desert dandelion ( <i>Malacothrix torreyi</i> )	Dry, sandy sagebrush steppe in the valley and foothill zones.
Beardless mentzelia ( <i>Mentzelia nuda</i> )	Sandy or gravelly soil of open hills and roadsides on the plains of eastern Montana
Dwarf purple monkeyflower ( <i>Mimulus nanus</i> )	Dry, open, often gravelly or sandy slopes in the valleys and foothills.
Nama ( <i>Nama densum</i> )	Sandy soil of sagebrush desert in the valleys.
Blue toadflax ( <i>Nuttallanthus texanus</i> )	Open, sandy or acid shale soils of grasslands and woodlands on the plains of eastern Montana.
Alpine poppy ( <i>Papaver kluanensis</i> )	Open, rocky slopes with delayed snowmelt in the alpine zone.
Large flowered beardtongue ( <i>Penstemon grandiflorus</i> )	Sandy soils of valley plains.
Double bladderpod ( <i>Physaria brassicoides</i> )	Stony or sandy soil of open grassland slopes on the plains in southeastern Montana.
Woolly twinpod ( <i>Physaria didymocarpa</i> var. <i>lanata</i> )	Sandy, often calcareous soil of open grassland or shrubland slopes in the plains.
Slender-branched popcorn-flower ( <i>Plagiobothrys leptocladus</i> )	Dry mud on the shores of ponds in plains and foothills.
Short-leaved bluegrass ( <i>Poa curta</i> )	Sparsely vegetated soil of Douglas-fir forest floor in the montane zone.
Low arctic cinquefoil ( <i>Potentilla hyparctica</i> )	Moist turf in the alpine zone.
Platte cinquefoil ( <i>Potentilla plattensis</i> )	Grasslands and sagebrush steppe in the valley and montane zones in south-central Montana.
One-flowered cinquefoil ( <i>Potentilla uniflora</i> )	Open, gravelly slopes and ridgetops in the alpine zone.
Bur oak ( <i>Quercus macrocarpa</i> )	Low, shale-derived hills on the plains.
Arctic buttercup ( <i>Ranunculus gelidus</i> )	Moist, open soil on tundra and talus slopes in the alpine zone.
High-artic buttercup ( <i>Ranunculus hyperboreus</i> )	Wet soil around ponds and along streams in the montane zone.
Persistent-sepal yellow-cress ( <i>Rorippa calycina</i> )	Riverbanks and shorelines in the valleys on the plains on the Missouri and Yellowstone Rivers.

**TABLE VEG-6**  
**STATE OF MONTANA CRITICALLY IMPERILED PLANT SPECIES WITH POTENTIAL HABITAT IN THE 16-COUNTY AREA**

Common Name (Scientific Name)	Habitat
Barratt's willow ( <i>Salix barrattiana</i> )	Cold, moist soil in the alpine zone.
Yellow marsh saxifrage ( <i>Saxifraga hirculus</i> )	Wet, organic soil of fen in the alpine zone.
Clasping groundsel ( <i>Senecio amplexans</i> var. <i>holmii</i> )	Stony, open soil and talus of slopes in or near the alpine zone.
Cut-leaf groundsel ( <i>Senecio eremophilus</i> var. <i>eremophilus</i> )	Moist streambanks and riparian forests in the valley and montane zones in south-central Montana.
Few-flowered butterweed ( <i>Senecio pauciflorus</i> )	Moist meadows and cliffs in the montane zone.
Shoshonea ( <i>Shoshonea pulvinata</i> )	Open, exposed limestone outcrops, ridgetops, and canyon rims, in thin rocky soils.
Oregon checker-mallow ( <i>Sidalcea oregana</i> )	Grasslands in the valley and montane zones.
Prairie aster ( <i>Solidago ptarmicoides</i> )	Open, dry grasslands, often on sandy soil or limestone on the plains of eastern Montana.
Few-flowered goldenrod ( <i>Solidago sparsiflora</i> )	Sandy soil of grasslands or open woodlands on the plains.
Slender wedgrass ( <i>Sphenopholis intermedia</i> )	Wet areas in the valleys or foothills.
Fleshy stitchwort ( <i>Stellaria crassifolia</i> )	Moist or wet meadows, often along streams, in the foothills to alpine zones.
Letterman's needlegrass ( <i>Stipa lettermanii</i> )	Limestone talus and dry fescue grassland in the valley and foothill zones in southern Montana.
Purpus' sullivantia ( <i>Sullivantia hapemanii</i> var. <i>hapemanii</i> )	Calcium-rich springs and seeps on moist canyon walls, streambank rocky zones, and near the spray zone of waterfalls.
California false-hellebore ( <i>Veratrum californicum</i> )	Wet meadows and streambanks in montane and subalpine zones.
Nannyberry ( <i>Viburnum lentago</i> )	Openings in riparian forests on the plains.
Many-flowered viguiera ( <i>Viguiera multiflora</i> )	Aspen woodlands and open slopes.

\*A type of creep that takes place in regions where the ground freezes to a considerable depth and as it thaws during the warm seasons the upper thawed position creeps downhill over the frozen material. The soil moves as a viscous liquid down slopes of as little as 2 or 3 degrees and may carry rocks of considerable size in suspension.

**TABLE VEG-7**  
**STATE OF MONTANA NOXIOUS WEEDS**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Category</b>
hoary cress	<i>Cardaria draba</i>	1
Cardaria complex (combined)	<i>Cardaria</i> spp.	1
diffuse knapweed	<i>Centaurea diffusa</i>	1
spotted knapweed	<i>Centaurea maculosa</i>	1
Russian knapweed	<i>Centaurea repens</i>	1
yellow starthistle	<i>Centaurea solstitialis</i>	3
rush skeletonweed	<i>Chondrilla juncea</i>	3
oxeye daisy	<i>Chrysanthemum leucanthemum</i>	1
Canada thistle	<i>Cirsium arvense</i>	1
field bindweed	<i>Convolvulus arvensis</i>	1
common crupina	<i>Crupina vulgaris</i>	3
houndstongue	<i>Cynoglossum officinale</i>	1
leafy spurge	<i>Euphorbia esula</i>	1
orange hawkweed	<i>Hieracium aurantiacum</i>	2
meadow hawkweed	<i>Hieracium caespitosum</i>	2
yellow-devil hawkweed	<i>Hieracium floribundum</i>	2
kingdevil hawkweed	<i>Hieracium piloselloides</i>	2
common St. Johnswort	<i>Hypericum perforatum</i>	1
dyer's woad	<i>Isatis tinctoria</i>	2
dalmatian toadflax	<i>Linaria dalmatica</i>	1
purple loosestrife	<i>Lythrum salicaria</i>	2
sulfur cinquefoil	<i>Potentilla recta</i>	1
tall buttercup	<i>Ranunculus acris</i>	2
tansy ragwort	<i>Senecio jacobaea</i>	2
saltcedar	<i>Tamarix ramosissima</i>	2
common tansy	<i>Tanacetum vulgare</i>	1

1 = Noxious weed: currently established and generally widespread in many counties.

2 = Noxious weed: recently introduced and rapidly spreading.

3 = Noxious weeds: not detected in the state or found only in small, scattered, localized infestations.

**TABLE VEG-8**  
**STATE OF MONTANA CRITICALLY IMPERILED PLANT SPECIES BY PROJECT AREA**

Common Name	Scientific Name	Known to Occur in the 16 Counties	Additional Information			
			Life Form	BLM	USFS	Wetland Indicator
Dwarf onion	<i>Allium simillimum</i>	Gallatin	HP			
Daggett rock cress	<i>Arabis demissa</i> var. <i>languida</i>	Carbon	HP	W		
Swamp milkweed	<i>Asclepias</i> <i>incarnata</i>	Carbon	HP			OBL
Ovalleaf milkweed	<i>Asclepias ovalifolia</i>	Carter	HP	W	S	
Narrowleaf milkweed	<i>Asclepias</i> <i>stenophylla</i>	Carter and Rosebud	HP	W		
Barr's Milkvetch	<i>Astragalus barrii</i>	Big Horn, Carter, Powder River, and Rosebud	HP	W	S	
Wind River vetch	<i>Astragalus</i> <i>oreganus</i>	Carbon	HP	W		
Wedge-leaved saltbush	<i>Atriplex truncata</i>	Park	HA	W		
Large-leafed balsamroot	<i>Balsamorhiza</i> <i>macrophylla</i>	Gallatin	HP	W	S	
Small camissonia	<i>Camissonia</i> <i>parvula</i>	Carbon	HA	S		
Pregnant sedge	<i>Carex gravida</i> var. <i>gravida</i>	Big Horn, Powder River, and Rosebud	Se			
Many-ribbed sedge	<i>Carex multicosata</i>	Gallatin and Park	Se	W		
Toothed Scandinavian sedge	<i>Carex norvegica</i> ssp. <i>inserrulata</i>	Carbon, Park, and Stillwater	Se			
Birchleaf mountain- mahogany	<i>Cercocarpus</i> <i>montanus</i> var. <i>glaber</i>	Treasure	SH	W		
Smooth goosefoot	<i>Chenopodium</i> <i>subglabrum</i>	Carter, Custer, Powder River,	HA	W		
Yellow bee plant	<i>Cleome lutea</i>	Big Horn and Carbon	HA	W		
Miner's Candle	<i>Cryptantha</i> <i>scoparia</i>	Carbon	HA	S		
Nine-anther dalea	<i>Dalea enneandra</i>	Custer	HP	W		

**TABLE VEG-8**  
**STATE OF MONTANA CRITICALLY IMPERILED PLANT SPECIES BY PROJECT AREA**

Common Name	Scientific Name	Known to Occur in the 16 Counties	Additional Information			
			Life Form	BLM	USFS	Wetland Indicator
Silky prairie clover	<i>Dalea villosa</i> var. <i>villosa</i>	Carter	HP	W		
Scribner's panic grass	<i>Dichanthelium</i> <i>oligosanthes</i> var. <i>scribnerianum</i>	Powder River	PGr	W		
White Arctic draba	<i>Draba fladnizensis</i>	Carbon and Stillwater	HP			
Porsild's draba	<i>Draba porsildii</i>	Carbon	HP			
Entire-leaved avens	<i>Dryas integifolia</i>	Golden Valley	SH			
Eaton's daisy	<i>Erigeron eatonii</i> ssp. <i>eatonii</i>	Sweet Grass	HP			
Beautiful fleabane	<i>Erigeron</i> <i>formosissimus</i> var. <i>viscidus</i>	Carbon and Park	HP	W		
Smooth buckwheat	<i>Eriogonum</i> <i>salsuginosum</i>	Carbon	HA	S		
Visher's buckwheat	<i>Eriogonum visheri</i>	Carter	HA			
Sheathed cotton- grass	<i>Eriophorum</i> <i>callitrix</i>	Carbon	G-L			
Hiker's gentian	<i>Gentianopsis</i> <i>simplex</i>	Carbon	HA	W	S	
Bractless hedge- hyssop	<i>Gratiola</i> <i>ebracteata</i>	Yellowstone	HA			
Discoid goldenweed	<i>Haplopappus</i> <i>macronema</i> var. <i>macronema</i>	Gallatin	SH		S	
Hutchinsia	<i>Hutchinsia</i> <i>procumbens</i>	Carbon	HA	W		
Large-fruited kobresia	<i>Kobresia</i> <i>macrocarpa</i>	Carbon	G-L			
Island koenigia	<i>Koenigia islandica</i>	Carbon	HA			
Lesica's bladderpod	<i>Lesquerella lesicii</i>	Carbon	HPsl	S		
Nuttall's desert parsley	<i>Lomatium nuttallii</i>	Big Horn	HP	W		

**TABLE VEG-8**  
**STATE OF MONTANA CRITICALLY IMPERILED PLANT SPECIES BY PROJECT AREA**

Common Name	Scientific Name	Known to Occur in the 16 Counties	Additional Information			
			Life Form	BLM	USFS	Wetland Indicator
Desert dandelion	<i>Malacothrix torreyi</i>	Carbon	HA	S		
Beardless mentzelia	<i>Mentzelia nuda</i>	Custer, Powder River	HB	W		
Dwarf purple monkeyflower	<i>Mimulus nanus</i>	Gallatin	HA			
Nama	<i>Nama dendum</i>	Carbon	HA	S		
Blue toadflax	<i>Nuttallanthus texanus</i>	Carter	HA	W		
Alpine poppy	<i>Papaver kluanensis</i>	Carbon, Park, and Sweet Grass	HPsl			
Large flowered beardtongue	<i>Penstemon grandiflorus</i>	Custer	HP			
Double bladderpod	<i>Physaria brassicoides</i>	Carter and Powder River	HP			
Woolly twinpod	<i>Physaria didymocarpa</i> var. <i>lanata</i>	Big Horn	HP			
Slender-branched popcorn-flower	<i>Plagiobothrys leptocladus</i>	Custer	HA	W		
Short-leaved bluegrass	<i>Poa curta</i>	Carbon	PGr	W		
Low arctic cinquefoil	<i>Potentilla hyparctica</i>	Carbon	HP			
Platte cinquefoil	<i>Potentilla plattensis</i>	Big Horn and Carbon	HP	W		W/FACW+
One-flowered cinquefoil	<i>Potentilla uniflora</i>	Potential, None Known	HP			
Bur oak	<i>Quercus macrocarpa</i>	Carter	TR	S		FAC-U
Arctic buttercup	<i>Ranunculus gelidus</i>	Stillwater	HPsl			
High-artic buttercup	<i>Ranunculus hyperboreus</i>	Gallatin	HP			
Persistent-sepal yellow-cress	<i>Rorippa calycina</i>	Custer and Yellowstone	HP			OBL
Barratt's willow	<i>Salix barrattiana</i>	Carbon	SH		S	
Yellow marsh saxifrage	<i>Saxifraga hirculus</i>	Carbon	HP			

**TABLE VEG-8**  
**STATE OF MONTANA CRITICALLY IMPERILED PLANT SPECIES BY PROJECT AREA**

Common Name	Scientific Name	Known to Occur in the 16 Counties	Additional Information			
			Life Form	BLM	USFS	Wetland Indicator
Clasping groundsel	<i>Senecio amplexans</i> var. <i>holmii</i>	Carbon	HP			
Cut-leaf groundsel	<i>Senecio</i> <i>eremophilus</i> var. <i>eremophilus</i>	Big Horn and Park	HP			FAC
Few-flowered butterweed	<i>Senecio pauciflorus</i>	Gallatin	HP			
Shoshonea	<i>Shoshonea</i> <i>pulvinata</i>	Carbon	HP	S	S	
Oregon checker- mallow	<i>Sidalcea oregana</i>	Gallatin	HP			
Prairie aster	<i>Solidago</i> <i>ptarmicoides</i>	Carter	HP			
Few-flowered goldenrod	<i>Solidago</i> <i>sparsiflora</i>	Stillwater	HP	W		
Slender wedgrass	<i>Sphenopholis</i> <i>intermedia</i>	Big Horn and Gallatin	AGr/PGr sl	W		
Fleshy stitchwort	<i>Stellaria crassifolia</i>	Carbon	HP	W		OBL
Letterman's needlegrass	<i>Stipa lettermanii</i>	Big Horn, Carbon, Park	PGr			
California false- hellebore	<i>Veratrum</i> <i>californicum</i>	Gallatin,	HP	W	S	
Nannyberry	<i>Viburnum lentago</i>	Big Horn	SH			
Many-flowered viguiera	<i>Viguiera multiflora</i>	Gallatin	HP			

AGr=annual grass

FAC=facultative plant

FACN+=facultative wetland plus plant

GL=grass-like

HA=herbaceous annual

HP=herbaceous perennial

OBL=obligate wetland plant

PGr=perennial grass

S=sensitive

Se=sedge

SH=shrub

W=watch